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THE AEROMETRIC AND EMISSIONS REPORTING SYSTEM (AEROS) MANUAL SERIES. VOLUME I. AEROS OVERVIEW

Environmental Protection Agency
Research Triangle Park, North Carolina

February 1976

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AEROS MANUAL SERIES
VOLUME I:
AEROS OVERVIEW

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

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16. ABSTRACT

The Aerometric and Emissions Reporting System (AEROS) was established by the Environmental Protection Agency to serve as a management information system for EPA's air pollution research and control programs. As such, AEROS is mainly concerned with the collection, processing, and reporting of basic air pollution data. Various supplementary data files are also maintained to provide additional information valuable for the preparation and analysis of air pollution data.

In addition to this overview Volume I, there are four additonal AEROS volumes which describe AEROS operations in more detail. AEROS Volume II is the AEROS User's Manual, which gives instructions for users to input data to AEROS, along with detailed systems descriptions. Volume III, the AEROS Summary and Retrieval Manual, is intended for those who want to obtain data from AEROS. Volume III describes AEROS reports, how they may be used, and gives instructions for how to obtain them. Volume IV is the NADB Internal Operations Manual, which documents in detail, all NADB procedures related to AEROS. Certain portions of Volume IV may be of interest to persons interested in all details of AEROS operations, but is intented mainly as a guide for NADB personnel. Volume V is the AEROS Coding Manual. It contains tables of standard codes required for AEROS data coding and serves as a companion to Volume II for users who want to input data.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
AEROS	APER		
NADB	WSAP		
NEDS	SIEFA		
SAROAD	CAASE		
HATREMS	REPS		
SOTDAT	SIPS		

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AEROS MANUAL SERIES
VOLUME I:
AEROS OVERVIEW

National Air Data Branch
Monitoring and Data Analysis Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

February 1976

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The Aerometric and Emissions Reporting System (AEROS) was established by the Environmental Protection Agency to serve as a management information system for EPA's air pollution research and control programs. As such, AEROS is mainly concerned with the collection, processing, and reporting of basic air pollution data. Various supplementary data files are also maintained to provide additional information valuable for the preparation and analysis of air pollution data.

The most important aspect of AEROS is as a reporting system. Figure 1.1.0-a illustrates how AEROS reports can meet a number of user requirements. Standard AEROS reports are published periodically and are available from the EPA Air Pollution Technical Information Center (APTIC) at Research Triangle Park, NC or the National Technical Information Service (NTIS) in Springfield, Va. Many of the standard published reports and a number of additional standard reports are also readily available from the National Air Data Branch (NADB), Research Triangle Park, NC or from the ten EPA Regional Offices. To meet requirements not met by standard AEROS reports, it is also often possible to restructure and report data as required in response to special requests.

The input forms, procedures, computer programs, data files and reports that are the basic components of AEROS are under the management of the National Air Data Branch. These elements are utilized to form a comprehensive system for the collection, maintenance, and reporting of AEROS data. NADB is the agency which coordinates all these activities. Actual data are collected and submitted by state agencies as required for SIP reporting requirements. The ten EPA Regional Offices are responsible for the receipt,

preliminary data processing, error correction and submittal of data to NADB. Regional Offices also support AEROS users in their region.

As indicated in Figure 1.1.0-a the major data components of AEROS are ambient air quality data and air pollution source and emissions data. The ambient air quality data consists of air quality monitoring site descriptions and the air quality data reported by measuring instruments at these sites, together with the appropriate pollutant and method codes required to identify the pollutants or meteorological parameters which are reported. The source and emissions data included in AEROS consist of descriptive information about air pollutant emission sources and estimated annual emissions along with the data required to calculate the emissions for each source. When available, results of source emissions tests are also stored in AEROS. The additional data elements indicated in Figure 1.1.0-a are incorporated in AEROS primarily although these additional data may also be of value for other purposes.

In addition to Volume I, there are four additional AEROS volumes which describe AEROS operations in more detail. Volume II is the AEROS User's Manual, which gives instructions for users to input data to AEROS, along with detailed systems descriptions. Volume III, the AEROS Summary and Retrieval Manual, is intended for those who want to obtain data from AEROS. Volume III describes AEROS reports, how they may be used, and gives instructions on how to obtain them. Volume IV is the NADB Internal Operations Manual, which documents, in detail, all NADB procedures related to AEROS. Certain portions of Volume IV may be of interest to persons interested in all details of AEROS operations, but is intended mainly as a guide for NADB personnel. Volume V is the AEROS Coding Manual. It contains

tables of standard codes required for AEROS data coding and serves as a companion to Volume II for users who want to input data. These manuals are designed to be flexible and responsive to the changing aspects of a large dynamic data handling system. To accommodate this flexibility, the manuals are produced in looseleaf form with replaceable sections.

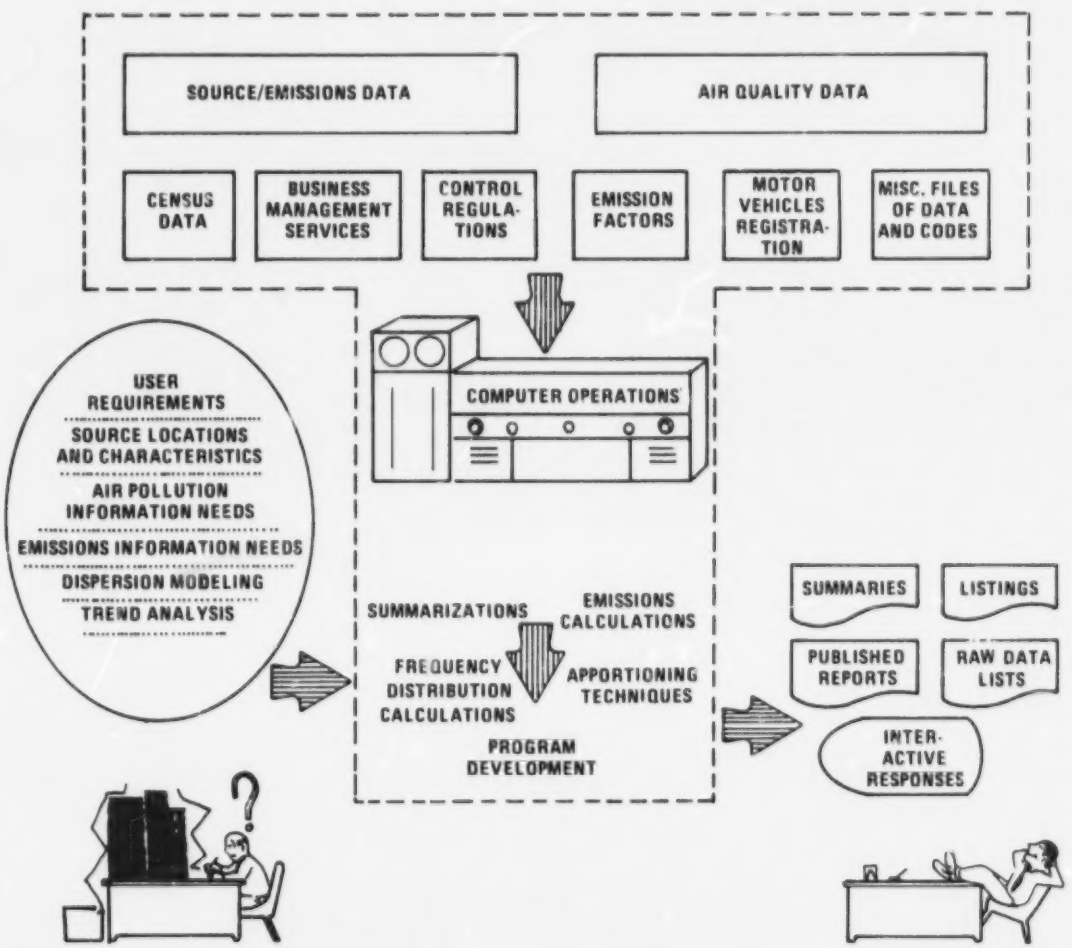

Figure 1.1.0-a. Aerometric and emissions reporting system (AEROS).

The use and purpose of AEROS is to provide hard data and basic information for:

1. Evaluation of plans and strategies to meet national ambient air quality standards (in support of Sections 107, 108, 109, 110 of the Clean Air Act).
2. Evaluation of emissions and control equipment for the development of new sources performance standards (in support of Section 111) and mobile source emissions standards setting (Sections 202 and 231).
3. Support of hazardous pollutants enforcement by EPA (Section 112), general enforcement actions by EPA (Section 113), and inspection/monitoring and other recordkeeping (Section 114).
4. Determination of the status, projections, and trends of air pollution for reports and progress evaluation (Sections 304, 312, and 313).
5. Studies of fuels, their usage and availability (Sections 104, 211, 312, and 318).
6. Research on monitoring of sources and ambient air for modeling in programs such as the Regional Air Pollution Study (Section 103).

So far, AEROS has been described as one unified air pollution data management system. However, many users interact with only certain AEROS subsystems, some of which are capable of functioning as independent data systems by themselves. An overview of each of these subsystems is given in Section 3, but as a reference to those interested in identifying the component subsystems of AEROS, the principal subsystems are listed below:

1. The National Emissions Data System (NEDS), which stores and reports source and emissions-related data for the five criteria pollutants (particulates, SOx, NOx, CO, and hydrocarboms).
2. The Storage and Retrieval of Aerometric Data SAROAD) system, which stores and reports information relating to ambient air quality.
3. The Hazardous and Trace Substance Emissions System (HATREMS), which stores and reports sources and emissions data for non-criteria pollutants.
4. The Source Test Data (SOTDAT) system, which stores and retrieves relevant technical data collected during source emission measurements (i.e., stack tests).
5. The State Implementation Plans (SIPS) regulation system, which provides retrievals of EPA-approved state air pollution control regulations.
6. The Emissions History Information System (EHIS), which provides historical trends information on nationwide emissions, and may also function as a computerized technique for examination of air pollutant emissions scenarios.
7. The Weighted Sensitivity Analysis Program (WSAP), which operates

on NEDS data to compute the variance which can be tolerated in the emission estimate for each source category in order that some overall user-specified limit shall not be exceeded.

8. The Source Inventory and Emission Factor Analysis (SIEFA) program, which complements WSAP by computing the actual (as opposed to allowable) imprecision in emission estimates for each source category in NEDS due to imprecision in emission inventory techniques and source data.
9. The Computer Assisted Area Source Emissions (CAASE) gridding system, which performs the calculations to apportion NEDS county emissions totals to sub-county, gridded areas.
10. The Regional Emissions Projection System (REPS), which may be used to make regional emission projections up to the year 2000.

In 1972 the Office of Air and Waste Management formed the National Air Data Branch (NADB) in Durham, North Carolina. This organization has the responsibility to amass source, emission, air quality, and related data from 55 states and territories into a single national air data management system at one location under one centralized administrative body. NADB includes the groups that developed the National Emissions Data System (NEDS) and the Storage and Retrieval of Aerometric Data (SAROAD) system. It became clear to NADB management that there were many common problems in the collection, maintenance, and use of the NEDS and SAROAD systems. Similar control procedures are required to manage receipt and processing of forms. Often the same people in both NADB and the Regional Offices are involved in processing NEDS and SAROAD data. Access to the systems requires use of the same terminals and equipment. These factors have led to a steady evolution toward standard procedures, techniques, and documentation for the two systems.

The Aerometric and Emissions Reporting System AEROS) is the system which resulted from this evolutionary development of NEDS and SAROAD. AEROS was chosen for the name, because it gives equal weight to both aerometric and emissions data; it emphasizes that the system is a reporting system, and while the acronym AEROS represents the distinction between aerometric and emissions data, AEROS also stands for aerosystem--therefore representing a complete, integrated system for air data.

In 1973 and 1974, it became apparent that EPA had an expanded need for data additional to those contained in NEDS/SAROAD and that the vsriety of data files maintained internally within NEDS/SAROAD could be separately and

independently used by data bank "customers." For these reasons, the concept of AEROS was expanded from an integrated NEDS/SAROAD data system to one which now encompasses other information systems such as source test data (SOTDAT), hazardous air pollutant sources (HATREMS), and computerized air pollution laws and regulations (SIPS). These systems are in varying stages of development and are described in detail in Section 3.

AEROS systems were originally installed on an IBM 360-50 machine located in Research Triangle Park, NC. At that time all EPA Regional Offices had access to AEROS via interactive terminals with the capability for batch and/or remote-batch requests. In 1973, EPA purchased a UNIVAC 1110 and, subsequently in 1974, all AEROS programs were converted to the configurations required by UNIVAC. NADB is continuing to enhance AEROS such that full advantage of the UNIVAC machine can be taken. Interactive and batch use of AEROS by the Regional Offices (via the UNIVAC 1110) is being implemented and expanded, although all AEROS reports can now be obtained directly from the National Air Data Branch.

Since the history of AEROS prior to 1972 is essentially the histories of NEDS and SAROAD, the development of these systems is discussed in the following chapters.

The development of NEDS was initiated in late 1971. Previously, source/emissions data had been collected by various agencies but had usually not been stored in any common format. A wide variety of techniques had been used to collect and report the data. Thus, it was very difficult to relate the emissions data from one location to those for another location and produce meaningful reports that could be made readily available to interested individuals. NEDS was created to provide a centralized source/emissions data bank for which standard input forms would be used and output reports could be quickly and efficiently generated to meet the requirements of the majority of users of source/emissions data.

Data collection and systems design were begun simultaneously by in-house personnel. Standard point and area source coding forms were designed. Available data, chiefly from emission inventories compiled by or for state and local air pollution agencies as a part of the requirements for preparation, adoption, and submittal of implementation plans under Section 110 of the Clean Air Act, were collected and coded on the standard input forms. This effort involved all EPA Regional Offices and numerous contractors, in addition to NADB personnel and the various state and local agencies. The general sequence in which data were collected was as follows:

1. NADB personnel coded all data available in EPA.
2. NADB personnel coded data available from state agencies.
3. NADB and Regional Office contractors collected items not previously obtained through the above efforts.
4. States participated in providing complete data bases or in making additions or corrections necessary for validation of the data base

and assumed responsibility for keeping the data current and up to date.

NEDS systems development provided for organization of the data into two files: point source and area source. The point source file provided for storage of approximately 80 data items for an individual source. A point source in NEDS is generally defined as any major stationary source emitting more than a specified amount of pollutants per year. The area source file provided only a record for each county equivalent in the U.S. with sufficient data to estimate emissions for all sources in the county not recorded as point sources in NEDS. Area sources, therefore, usually include small stationary sources such as domestic and commercial heating, all mobile sources, and miscellaneous sources. NEDS was originally operable on an IBM 360-50 computer, but since the installation of a UNIVAC 1110 at EPA's Research Triangle Park, NC facility, all NEDS operations have been or are being converted to UNIVAC-compatible software.

The responsibility for NEDS data collection and error corrections was entirely decentralized in 1973 to the state agencies and EPA Regional Offices, whereas the authority to insert data into the NEDS system remains centralized in NADB. Pursuant to the Federal regulation 40 CFR 51.7 (Preparation, Adoption and Submission of Implementation Plans), state agencies are required to make semiannual reports for selected point sources in the standard NEDS format. These data submittals are the chief vehicle for updating the NEDS point source data. The semiannual reports are supplemented by voluntary data submittals by states, reflecting changes in their own source/emissions data files. The National Air Data Branch retains the primary responsibility for updating area source data. NADB performs annual area source

updates, supplemented with data voluntarily submitted by state agencies for improvement of the data base.

In the short time that NEDS has been in existence, the point source file has grown rapidly to include data for more than 94,000 emissions sources at nearly 34,000 facilities throughout the country. The area source file, with one record per county (or county equivalent), contains about 3,200 records.

Development of SAROAD was preceded by early programs for the collection of air quality and associated meterological data. The National Air Sampling Network (NASN) was developed in 1953 as the first nationwide air monitoring system. When Congress passed Public Law 159 in 1955, the present policy that state and local governments have the fundamental responsibility for dealing with community air pollution problems was established. Subsequently the scope of NASN broadened tremendously, both in geographical and pollutant coverage. The passage of the Clean Air Act of 1963, authorizing the awarding of grants directly to state and local agencies for maintenance of their own control programs, produced an additional need for dissemination of air pollution data. This need generated the idea for creation of a national air quality data bank and, by 1966, the SAROAD computer system had been developed. SAROAD handles the flow of data into and out of the bank, including data preparation, validation, and retrieval. The set of physical files and the data contained therein, upon which SAROAD operates, is known as the National Aerometric Data Bank. SAROAD formats and coding structures were organized into three categories: parameters, sites, and data. Parameters are codes identifying the pollutant or meterological data item which is measured along with the methods of collection and sample analysis used. Sampling sites are identified by a series of geographical codes along with descriptive information about the site. The air quality data must be identified with the appropriate parameter and site codes along with codes to define sampling interval and units in order to be accepted in SAROAD format.

Since the development of SAROAD, there has been a large increase in the number of agencies operating air sampling networks. From the fewer than 200 contributing stations in 1966, the SAROAD site file has grown to approximately 4,000 operational sites. An additional 3,000 monitoring

stations may become operational in the next several years as the result of attainment of State Implementation Plans. There are currently over 58,000,000 aerometric data values in the data bank with approximately 15,000,000 values updated annually. Historically, data were submitted to SAROAD on a voluntary basis by EPA programs and by state and local agencies. Almost all SAROAD data have been collected by groups outside the National Air Data Branch, although considerable effort has been expended by NADB and contractor personnel to convert available data to SAROAD format. This data-conversion effort began in 1969-1970 to enter all available valid data into the data bank. All together, about 9,000 sites have been defined and have submitted data. Many of these sites have discontinued operation, since only about 4,000 sites are presently operational. With the implementation of Federal reporting requirements (40 CFR 51.7) in 1972, which require state agencies to submit quarterly reports on air quality data, the volume of data processed has increased to its present level. State agencies were required to submit, in SAROAD format, all data gathered from the air quality surveillance network required under the State Implementation Plan. This was the principal mechanism for updating SAROAD, although a considerable amount of data for non-SIP sites and non-criteria pollutants were reported as well.

AEROS is a computerized data handling and reporting system developed and maintained by the National Air Data Branch of EPA for the management of numerous types of air pollutant information. AEROS accepts as input numerous kinds of information supplied by many groups outside of EPA, stores this information along with various internally supplied supporting data, and utilizes both types of information to output a wide variety of reports which may be needed in air pollution research and control activities.

Strictly speaking, AEROS is not one single system but, rather, is a network of interrelated systems, each of which is capable of providing a special data-management function. Because all of these systems are maintained by EPA in one centralized location (the National Air Data Branch) and because many share certain elements in common (e.g., standardized codes, procedures, documentation, etc.), it is advantageous from a conceptual standpoint to conceive of these various systems as providing one basic function--air pollution data management.

The purpose of this chapter is to describe briefly the network of systems which comprise AEROS, including the nature of the data required as input, the way the data are stored, and the types of reports generated. For more specifics in any of these areas, the reader is referred to subsequent volumes of this manual.

The major systems which comprise AEROS are NEDS (National Emissions Data System) and SAROAD (Storage and Retrieval of Aerometric Data). NEDS deals with source and emissions information, whereas SAROAD deals with ambient air quality. An overview of these systems follows.

3.1.1.1 NEDS

The National Emissions Data System is a computerized data handling system which accepts, stores, and reports on information relating to sources of any of the five criteria pollutants (particulates, SOx, NOx, CO, and hydrocarbons). In NEDS, a major distinction is made between two types of sources: point sources and area sources. Point sources, in the broadest sense, are stationary sources large enough to be identified and tracked individually; although, per NEDS reporting requirements, they are any plants with a potential of emitting more than 100 tons/year of any of the criteria pollutants. Area sources, on the other hand, are those stationary and mobile sources which individually emit much less than 100 tons/year and are too small and too numerous to keep individual records on. In NEDS, area sources are considered collectively on a county basis. A large boiler within a power plant would be an example of a point source, whereas a single automobile is an example of the type of source considered collectively as an area source.

In NEDS, all source-related data are entered into the system via specially formed point and area source coding forms and are stored in separate point and area source files. The type of data stored in the system for point and area sources is somewhat different and is described below.

Point Source Data

General source information - Name, address, types of source,

year of record, comments, etc.

Emissions data - Operating or production rate, estimated emissions, EPA calculated emissions, control device type and efficiency on each criteria pollutant, etc.

Modeling parameters - UTM coordinates of source, stack height, and diameter, exhaust gas temperature, and flow rate.

Compliance information - Allowable emissions, applicable control regulations, compliance status, and schedules, etc.

Area Source Data

General source information - Name and location of area (county) source, population, year of record.

Activity levels - Countywide activity level of each type of area source (e.g., tons of coal burned in all domestic space heating equipment in a county).

Emissions data - Emission estimates for the entire county (for each pollutant) as well as for each area source category.

Currently in NEDS, information is being maintained on approximately 94,000 point sources and about 3,200 area (county) sources in the 55 states and territories of the United States. The point source total will fluctuate as additional sources are reported, new sources come into operation, or old sources cease operations, whereas the number of area sources is fixed by the number of counties.

The information contained in these files changes too. As plants add to, modify, or change the operation of their equipment, utilize different fuels, etc., the point source data must continuously be updated to reflect

these changes. Likewise, as the activity levels of the various area sources change (e.g., more vehicle-miles may be traveled by automobiles in a county, more oil and less gas may be burned for home heating, etc.) their records must likewise be updated. It is the responsibility of the states (as required by Federal regulations) to maintain the point source data. Area source data, because of their composite nature, are generally maintained centrally by NADB, although state-supplied data will be accepted if they are more accurate. All data submitted are edited and validated prior to being accepted into the system.

In addition to the point and area source files, emission factor files are maintained by NADB as a part of NEDS. Emission factaors are essentially conversion factors which, when multiplied by the operating rate of a point source or activity level of an area source, yield emission estimates of each pollutant for that source. Emission factors are an important concept in NEDS because they enable emission estimates to be made for a source when no source test information is available.

The most important function of NEDS is report generation. Output reports obtainable from NEDS range from reports on individual point and area sources to sophisticated summary reports which aggregate the data in a variety of ways and condense the data form many sources into one report. Also, because of the file design employed in NEDS, numerous selection and sorting criteria can be specified by the user of the system. This allows one, for a given output report, to specify which sources from the entire file are selected and the manner in which the information on the output report is arranged. As an example, the user could have specified that the

report include only information on sources in a given geographical area and have the output arranged in order of descending amounts of pollutants emitted.

The following describes the more important reports available from NEDS. This is not necessarily a complete list since NEDS is continually being expanded to facilitate additional user needs.

Complete point or area source listing - These reports include in a standard format, all of the source and emissions data stored in NEDS for individual point or area sources. This includes all of the data supplied to NEDS on point and area source input forms as well as any emission estimates calculated by EPA through the use of emission factors.

Condensed point source listing - This report yields an abbreviated listing of data items for each point source, including the plant name, location, control device (and efficiency thereof) and the emissions associated therewith.

Emissions summary report - This report outputs, for a specified geographical area, emissions of each of the criteria pollutants associated with all of the source categories represented in NEDS as well as the total emissions for all source categories.

Area Source fuel summary listing - This report shows the amounts of various types of fuels consumed by major user categories (residential, commerical/institutional, and industrial) for a

specified geographical area. This summary includes area source records only.

Plant emissions report - This report presents a listing of the names of plants in NEDS and the emissions associated with each plant.

Fuel summary listing - This report shows the fuel amounts consumed by all stationary and mobile source categories for a specified geographical area. This report includes both point and area source records.

SCC (Source Classification Code) emissions report - This report shows each SCC, the number of times that SCC occurs within a specified geographical area, and the total emissions for each of the five pollutants associated with each SCC. (Note that a SCC is a code used in NEDS to represent different kinds of point source categories.)

Allowed vs. actual emissions - This report shows, for each point source, the emissions that point is allowed to discharge by law as well as an estimate of the amount of each pollutant that is actually being emitted.

Missing items report - This report totals the data items that are missing in the point source records for any geographical area of interest.

Again, numerous selection and sort criteria are available to the

user to enable him to specify which point and area source records are utilized in any of these reports and in what order the output should be arranged. For more details of the NEDS report generating capabilities and of the various selection and sort criteria which are available, the reader should consult Volume III.

NEDS is currently operational on a UNIVAC 1110 located at Research Triangle Park, NC. It is accessible in the batch and remote batch modes by EPA headquarters and regional personnel.

3.1.1.2 SAROAD

SAROAD is a computerized data handling system that accepts, stores, and reports on information relating to ambient air quality. There are two distinct classes of information which are accommodated in SAROAD: ambient air quality data and sampling site information. These are described below.

Ambient air quality data - That information which must be supplied to SAROAD in order to completely characterize the air quality at a site over a specified time interval. This includes the location of the sampling site, the pollutants which are monitored at that site, the methods of collection and analysis of each pollutant monitored, the magnitude of each pollutant concentration, and the time interval over which the measurements are made.

Site information - Site information includes detailed descriptive information about the location and environment of the sampling

site. This includes the state,a county, and city wherein the site is located, the latitude and longitude of the site and its elevation above the local terrain and mean seal level. It also includes a description of the site location (center city, suburban, rural, or remote) as well as the dominating influence on the sampler within approximately a 1-mile radius of the sampling site (industrial, residential, commercial, or mobile).

Air quality data are supplied continuously to the National Air Data Branch of EPA by state and local agencies as well as a number of Federal air quality networks. Site information, on the other hand, is submitted only once for each location, although it must be updated whenever the site environment changes.

Because SAROAD, like NEDS, is a large computerized system, and must handle data from all of the states and territories, all information submitted to SAROAD must be in a standardized format. To facilitate this, special SAROAD input formats (accomodating data on paper forms, cards, or magnetic tape) have been defined, and an elaborate system of codes has been established to ensure standardization and ease of data submission on the part of any contributing agency. In addition, a number of edit checks have been instituted to screen all data being submitted to the system.

Currently, air quality information is being submitted by over 4,000 air monitoring sites across the nation. The number of aerometric data values stored in SAROAD is approaching 58,000,000, with approximately 15,000,000 values being added to the system annually.

The most important function of SAROAD is report generation. A wide variety of standard and special request reports are available, the more important of which are described below.

Yearly frequency distribution - This report lists, for each sampling site and for a specified year, the site description, the pollutants monitored at that site, the methods of pollutant collection and analysis, the minimum, maximum, and certain percentile values for each pollutant, and the arithmetic and geometric means and geometric standard deviation. The means are calculated only when data meet NADB summary criteria.

Quarterly frequency distribution - This report is identical in format to the yearly frequency distribution except that the data are summarized on a quarterly, rather than yearly, basis.

Yearly report by quarters - This report lists for each sampling site and for a specified year, a description of the site, the pollutanta monitored at that site, the numbers of observations and the arithmetic average for each quarter, the annual arithmetic average, and the arithmetic standard deviation for the year.

Quarterly composite listing - This report lists, for each sampling site and for a specified year, the four quarterly values and yearly average value for each pollutant.

Yearly data inventory by site - This report lists for each site the number of years for which the data are available for each pollutant. For each year, the number of observations, the arithmetic

average, and the maximum value observed are printed.

Yearly data inventory by pollutant - This report lists, for each pollutant, the number of years for which data are available for each sampling site as well as the number of observations and the maximum volume observed.

Standards reports - This report shows, for each sampling site, when and the number of times the various air standards have been exceeded for a given pollutant.

Raw data listings - Several such reports are available which list, for a given site, the actual raw data values entered into the system for each pollutant over various time intervals.

Site description inventory - This report displays all of the site information that is stored in SAROAD for each sampling site.

Active site listing - This report displays all SAROAD site data for each active sampling site for a requested time period as well as the parameters sampled at a site.

In most of these reports, various selection criteria can be employed which allow the user to limit the number of records the system will process in generating a particular report. For instance most of these reports have geographical selection criteria which allow the user to obtain records for certain areas of interest such as a particular state, AQCR, etc. In some reports, the user can select by pollutant

or a specific pollutant/method or pollutant/interval combination. Still others allow the user to select only data pertaining to specified years.

For more information on the output reports available from SAROAD, the formats thereof, and the various selection criteria available, the reader is referred to Volume III.

3.1.2.0 Other AEROS Systems

Although NEDS and SAROAD are considered the major AEROS systems, a number of other systems have been developed to facilitate various other data management functions. For instance, one particular system has been designed as a subsystem of NEDS to accommodate data on non-criteria pollutants. Another system stores information on Federal, state, and local air pollutant regulations. Yet another system is available under NEDS to estimate the error which exists in the emission inventory. Although many of these systems can function independently of one another, there are common linking elements in the systems which facilitate a better correlation of the results.

A brief narrative description of each of these other AEROS systems follows. For more detailed information, the reader is referred to subsequent AEROS volumes.

3.1.2.1 HATREMS (Hazardous and Trace Substance Emission System)

HATREMS is being developed as a subsystem to NEDS. It allows additional source and emissions information to be coded and stored for any NEDS source for any non-criteria pollutant. Data submission, storage, and output capability will closely parallel that currently employed in and available from NEDS for the five criteria pollutants.

3.1.2.2 SOTDAT (Source Test Data System)

SOTDAT is designed to store and retrieve all relevant technical data collected during the measurement of pollutant emissions from point sources, i.e., stack test data. Such tests are routinely conducted by numerous groups both within and without EPA for research and enforcement

purposes. Three to five separate "runs" are usually accomplished for each stack test, each of which can be coded onto the SOTDAT forms and entered into the SOTDAT data base. Presently SOTDAT contains data from source tests covering a wide range of stationary combustion facilities, chemical processes, mineral products and other source categories. Approximately 500 source tests have been incorporated into SOTDAT as of January 1975, and it is expected that between 300 to 500 will be added each year as they are made available. At present, only limited retrieval capability exists, but it is expected that additional programming will be available as the file grows and as usage demands are increased.

3.1.2.3 SIP (State Implementation Plan) Regulations

This system has been developed to store the full text of all EPA-approved state air pollutant regulations. There are currently two basic outputs from SIPS. One provides a full text retrieval of each regulation as it applied to one of approximately 160 identifying codes (e.g., source surveillance, record keeping, SOx controls, etc.). This can be run for any state, AQCR, or county. Another totals the number of regulations that meet the retrieval specifications. This allows the user to answer "how many?" questions and to estimate the potential volume of the full text retrieval.

As of January 1975, approximately 5,000 state regulations have been loaded into the SIP file, and it is expected that several hundred regulations may be added each year. Future plans call for the expansion of SIPS to include federally promulgated regulations. In addition, programming capability is planned to correlate the regulations contained in

SIPS with the sources in NEDS to which those regulations are applicable.

3.1.2.4 EHIS (Emissions History Information System)

This system is being developed as a computerized technique for producing air pollutant emissions scenaries. It utilizes as input production rates and activity levels for various types of sources, along with emission factors, fuel, and control device information; it outputs emission estimates of various pollutants from each major source category in a given geographical area over a period of time. At present, plans are mainly to utilize this system to produce historical trends information on a nationwide basis, although it can be used for other purposes such as control strategy evaluation, emissions projections, etc.

3.1.2.5 WSAP (Weighted Sensitivity Analysis Program)

WSAP is a computerized analysis which is designed to operate on the NEDS emission inventory files. It computes the variance which can be tolerated in the emission estimate for each source category in order that some overall user-specified limit shall not be exceeded. WSAP is thus mainly a managerial tool that can be utilized to determine how much effort should be expended to improve the emission inventory for each source category. WSAP can be run on a nationwide, regional, AQCR, state, or county basis for any of the NEDS pollutants.

3.1.2.6 SIEFA (Source Inventory and Emission Factor Analysis)

SIEFA, like WSAP, is a computerized analysis which operates on the NEDS emission inventory files and is, in fact, the logical complement to WSAP. SIEFA computes the actual (as opposed to allowable) imprecision that exists in each of the emission estimates for each source category in NEDS due to the errors in the emission inventory techniques as well

as well as the point and area source data to which these techniques are applied. SIEFA can be utilized as a managerial tool to point out where the largest sources of error exist in one's inventory and where inventory improvement is most needed.

3.1.2.7 CAASE (Computer Assisted Area Source Emissions) Gridding System)

CAASE is a series of programs developed to apportion the NEDS area (county) source emission estimates to smaller areas, called grids, within each county. These programs utilize as input the NEDS area source files as well as certain census data from the Bureau of the Census (population, number of housing units, etc.), output maps of entire EPA air quality control regions (AQCR's) which have been gridded according to population density (the most density populated areas being represented by the smallest grids), and information indicating the level of each pollutant being emitted by the area source activity within each grid. The output from CAASE is utilized, in turn, as input for EPA dispersion modeling programs, which offer better resolution of area source emissions data than NEDS can provide.

3.1.2.8 REPS (Regional Emissions Projection System)

REPS has been developed to estimate future air pollutant emissions. Basically, REPS utilizes the existing NEDS point and area source data, projected regional and national growth data supplied by the U.S. Department of Commerce, and various other information (e.g., emission factors, allowable emission levels, etc.) to project what the emissions will be from various source categories for certain years up to the year 2000. In addition to this basic capability, the user can exercise various

override capabilities (i.e., insert data other than that provided by the NEDS files or the Department of Commerce, etc.) and as a result, be able to project the most probable emissions at some future date as well as evaluate the impact that certain changes (e.g., changes in required emission controls, industrial growth, etc.) may have. REPS thus can be utilized as a management tool for evaluating air pollution control strategies.

State and local agencies, EPA Regional Offices, and the National Air Data Branch are the organizations interacting in the operation of AEROS. The state and local agencies collect and prepare NEDS and SAROAD data for input. IN turn the EPA Regional Offices receive, process, and validate the state-submitted data and then submit them to NADB for entry into the AEROS Data Bank. Also, the Regional Offices handle regional user requests by directly accessing the AEROS Data Bank through remote batch and interactive terminals. Lastly, NADB is charged with overall EPA responsibility for managing the AEROS system, ensuring the timeliness and quality of data in the AEROS Data Bank, providing an effective and responsive reporting facility, and preparing standard reports for publication. Figure 4.1.0-a graphically illustrates the organizational reponsibilities related to AEROS data input.

Essential to the understanding of the policies governing transfer of data between these organizations is the concept of the AEROS data auditing system. The purpose of the data auditing system is to assure accuracy and completeness of the data processed by and contained in AEROS, particularly the NEDS and saroad data submittals required by law. This data accuracy and completeness is essential to the proper accomplishment of the management functions for which AEROS was developed. The various organizational reponsibilities for each are as follows:

1. EDIT: When data are added to the data banks, certain minimum information must be available in the standard format(s) before it will pass automatic computerized EDIT routines. Upon submittal of data by state or local agencies, the EDIT routines, applied by either the Regional

Office or NADB, determine whether the data have met the mimimum requirements for updating. If the data fail EDIT, an error listing is returned to the state agency for correction, and data are rejected and not updated.

2. VALIDATION: After an information record passes EDIT, it undergoes VALIDATION. This procedure incorporates additional computerized routines to determine whether the data submitted reflect a true or realistic situation. These routines may execute certain "rules of thumb," guideline values, or reasonable range checks, etc. The VALIDATION routines are operated by NADB. Even though a submission fails validation, it is allowed to enter the files. A listing of data failing validation is returned to the Regional Office for the attention of the proper state or local agency.

3. CERTIFICATION: This procedure consists of review of data in the form of printouts or publications, by knowledgeable officials, to ensure that the "valid" data may be CERTIFIED to be correct. This procedure, performed by individuals with sufficient background and authority to represent the data source (i.e., air monitoring site operator or industrial plant engineer), is an informal activity which represents an extension of the VALIDATION concept. CERTIFICATION has no legal status at this time.

4. DATA ANOMALY INVESTIGATION: On occasion, questions as to the correctness of data records are raised by data users. In those cases when questions are referred to NADB or the Regional Office representative, a procedure is instituted whereby questions are referred to a knowledgeable

source, normally a state agency, for resolution. Based on the response from the knowledgeable source, appropriate data corrections are made, and the user who originally questioned the data is notified of the resolution of the problem, if desired.

5. VERIFICATION: When questions arise as to whether data records not contained in the system at present should be added, a VERIFICATION procedure is initiated. This may result either from questions raised by knowledgeable data users or independent cross-checking of data records by NADB. In either case, a temporary "verification file" record is established for the data in question, and these records are forwarded through the Regional Office to a knowledgeable authority, again usually a state agency. This authority is reponsible for the determination of whether the VERIFICATION records are correct. If data are VERIFIED, they are added to the appropriate data bank through the EDIT and VALIDATION routines mentioned earlier. If VERIFICATION is negative, the temporary record is deleted from the VERIFICATION file. VERIFICATION is used primarily in the context of adding new air quality sampling sites, new or modified emissions sources, and existing sampling sites or emission sources which have inadvertently been left out of the system.

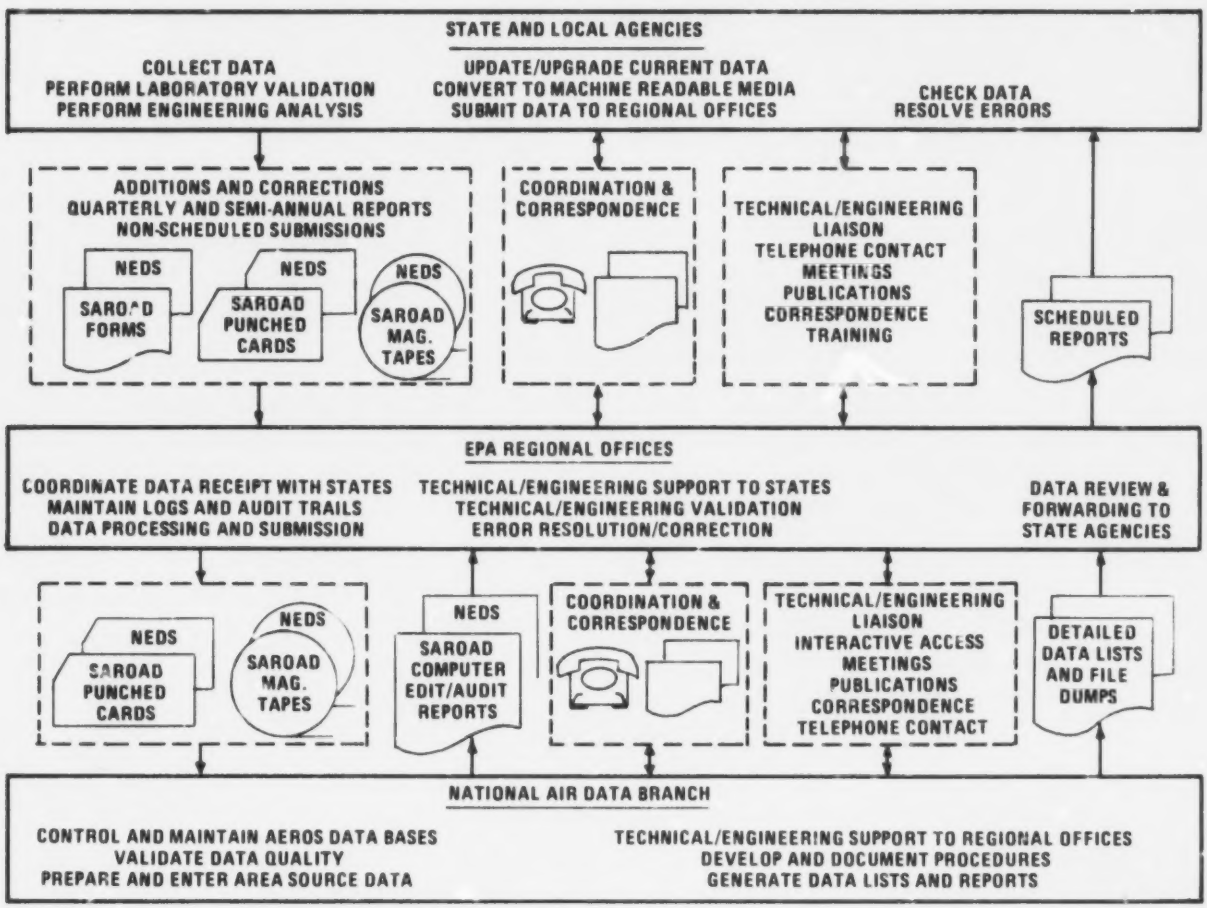

Figure 4.1.0-a. Organizational functions related to AEROS data input.

Specifically, state responsibilities are prescribed by the Federal regulations (40 CFR 51.7) requiring submission of periodic reports under the requirements for preparation of State Implementation Plans. These reports are described as the following subjects in this chapter. In addition, an informal role for state or local agencies is required to carry out the AEROS procedures relating to correction of data failing EDIT or VALIDATION routines, DATA ANOMALY INVESTIGATION, and VERIFICATION procedures.

The quarterly reports are, in effect, the air quality data and site descriptions (if necessary) for monitoring sites. The data may be sent in more frequently than quarterly if desired, but must be submitted to the Regional Offices in SAROAD format on either coding forms, punched cards, or magnetic tape.

Data for all operational sites beginning with those used in plan preparation must be submitted. Quarterly reports must be submitted within 45 days after the end of each reporting period (March 31, June 30, October 31, and December 31).

The semiannual report consists of a submission of the properly coded NEDS point source records for any facility which has the potential for emitting more than 100 tons per year of any pollutant for which a national air quality standard has been promulgated and also meets any of the following conditions:

a. Those which came into compliance with an emission-limiting control regulation during the reporting period.
b. Those which were new or modified or which received approval to construct, or whose operation becan in the reporting period.
c. Those which ceased operations during the reporting period [identification codes, name, address, and the comment "ceased operations (date)"].

The semiannual reports must be submitted within 45 days after the end of each reporting period (June 30 and December 31).

During the initial stages of implementation and system operation the functions of data collection, editing, processing, and validation were performed directly under the management of the National Air Data Branch (NADB). With the approval of the NEDS and SAROAD forms by OMB (Office of Management and Budget) and with the expanding use of these forms for state submission of semiannual and quarterly reports, the responsibility for receipt, processing, and editing of the NEDS/SAROAD data has been assigned to the Regional Offices. In addition, the Regional Offices are responsible for supporting users of AEROS in their region. Specific Regional Office responsibilities are listed below:

a. Identify the ADP personnel assigned to provide technical assistance to air programs and ensure that their proficiency is maintained as AEROS users.
b. Provide ADP assistance to states as required for submission of reports in computerized form.
c. Keypunch and/or convert any data received from states in non-SAROAD/NEDS formats.
d. Correct errors found through terminal edit routines. (Or ensure that proper corrections are made by state or local agencies.)
e. Perform field audits to assure the quality of emissions inventories.
f. Check air quality monitoring sites for proper procedures, and ensure that number and location are correct to provide proper data for trend monitoring.
g. Supply printouts, cards, or tapes of data from NEDS/SAROAD as requested by states; answer questions from the public concerning data pertaining to their respective states.

h. Assure quality control of laboratories working with air qiality data.

i. Make all efforts possible to provide up-to-date source test results for the improvement of emission factors.

The National Air Data Branch's reponsibility consists of four functional areas relating to maintenance of AEROS. Data processing is required to process input data. Information requests, liaison with the AEROS user community, and publication of reports involve output of data. Computer and information technology is needed to provide technical support, planning, and development services. Engineering and analytical skills are needed to provide a wide range of support services including management and updating of all necessary technical data not required in the state quarterly and semiannual reports. NADB's organization relfects these functional areas of work. As a result NADB consists of four sections, each of which performs work in one of the above areas. These sections are respectively: Data Processing Section, Requests and Information Section, Systems Development Section, and Emission Factors Section. Specific functions of these sections are described in the following paragraphs.

General functions of DPS include:

1. Operate OAQPS batch terminal and courier service, coordinate interactive terminals, and maintain records of productivity and computer utilization, including NADB portion of total NCC and OSI relative to all other users (including RO's).
2. Data processing: coding, keypunching, job submittal, data auditing.
3. Maintain backup files and security.
4. Generate management status reports on the availability of data and prepare computerized publications of data.
5. Computerized requests processing and data base updates.
6. Files and systems maintenance.

FUNCTIONS RELATED TO OUTPUT

I. Data Input
   1. Receives and edits emissions data provided under semiannual report requirements.
   2. Receives and edits air quality data provided under quarterly report requirements.
   3. Maintains record keeping files for (1) and (2) above and coordinates directly with ROs regarding their submissions.
   4. Performs (1), (2), and (3) above for all other air quality and emissions data received by NADB; processes data provided for annual updating of the computerized files for vehicle registration, Federal facilities, FPC form 67, control equipment, census data, SCC file, emission factor file,

and other files determined by the Emission Factors Section to be related to calculations.

5. Implements edit and validation checks of all data prior to acceptance into the data banks and specifies new checks as needed to improve quality assurance of all data received (programming by SDS). Formulates procedures for data submission and serves as focal point for contacts regarding this activity.
6. Arranges all keypunching of data as needed and defines keypunching instructions and checks.

II. Data Output

1. Processes 500 standard requests annually for data using existing or slightly-modified programs; processes retrievals from other data bases or other systems as developed by SDS.
2. Arranges record keeping documentation for (1) above and is responsible for any follow-up action (e.g., getting tapes back to NADB).
3. Creates and maintains historical files of quarterly and annual air quality and semiannual (1972 to present) emissions data (at R + 120).
4. Maintains internal/external interlocks to provide for security of data.

OTHER FUNCTIONS

1. Provides documentation of data processing procedures utilized in the Section.

2. Conducts minimal/minor programming activities for file maintenance and special data retrievals (supplies documentation of any/all changes and additions to SDS).
3. Maintains records of computer and terminal utilization and access/retrieval from data banks; prepares reports on this subject as required.
4. Is responsible for all data transfer to and from other systems as required.
5. Provides all necessary effort to maintain the computerized systems of NADB, following complete documentation by SDS.
6. Conducts data processing operations associated with Edit/Validation/Verification/Certification, except computer systems design and programming.

General Functions of SDS include:

1. Develop and document computer programs until emissions are established prior to handover to DPS.
2. Conduct program and file maintenance and trouble-shooting procedures as requested by DPS.
3. Conduct liaison with RTCC, MIDSD, and GSA on computer control activities.
4. Develop special programs to handle special requests.
5. Develop new programs and modify existing programs in prioritized order.
6. Maintain continuous enhancement and upgrading project.
7. Maintain program/files documentation library.

FUNCTIONS RELATED TO PROGRAM OUTPUT

1. Identifies needs for future programming and annually develops approximately 50 new storage, retrieval, editing, and reporting programs.
2. Develops and processes all non-standard data retrievals, prepares documentation, and incorporates into program library.
3. Provides NADB terminal access and develops terminal-users instructions for retrieving FPC, Polk vehicle registration, and other computerized data (publication, when appropriate, by RIS); assists and advises DPS in the procurement of data bases; procures other data handling or processing systems.
4. Develops annual revisions and additions to the terminal users manuals (publication by RIS).

5. Performs all operations (maintenance, development, implementation) for the interactive systems (including interactive system to submit remote batch jobs).

OTHER FUNCTIONS

1. Provides documentation for all programs in (1) above and ensures that all ADP programs developed via contracts are properly documented for direct inclusion into the operating manual for use by OAQPS users.
2. Maintains operating manual relating to ADP documentation and library of programs.
3. Designs data security procedures and internal/external interlocks for protection of data.
4. Collects and incorporates into program library programs and documentation developed by other OAQPS and Regional Office ADP groups as appropriate; coordinates (where possible) all programming efforts related to NADB data bases with OEGC, ORD, OAQPS, and RO.
5. Prepares procurements for all ADP and related equipment and assists in operation when problems arise or expertise is required.
6. Advises and consults with ROs and states on development of compatible conversion programs, AQDHS, CDHS, CDS, etc.
7. Performs ADP user surveys as required.
8. Serves as project officers or co-project officers on all contracts which involve ADP applications.

9. Maintains all NADB system libraries including computerized files of source and absolute elements and runstream.

General Functions of EFS include:

1. Develop engineering methodologies for air quality, emissions, and other systems, collection, modeling inputs, and provide control equipment data.
2. Collect baseline data as necessary for new systems, emission factor development, area source inventory, control efficiencies, estimation of required emissions; perform short-term tasks as requested.
3. Conduct data anomaly investigations as requested by DPS or as special projects.
4. Act as RAPS lead for emission inventory development.
5. Maintain currency and validity of computational values and procedures used in systems.
6. Maintain hard copy files, references, and maps as necessary for Branch use.

FUNCTIONS RELATED TO OUTPUT

I. Updating Data Bases
   1. Collects data for updating of:
      Area Source File (requires annual data collection)
      Source Test Data File
      Emission Factor File (Stationary and Mobile)
      Source Classification Code File
      History and Projection Source Inventory and Emission Factors Files
      Census Files

Polk Files
Other Miscellaneous Files

2. Develops methodology and coordinates RO/states for data updating and upgrading other than semiannual and quarterly reports; performs cross-checking on emission sources and institutes verification actions.

II. Provides technical evaluation of data required as input to:

1. Annual publication of air quality and emissions of criteria pollutants.
2. Periodic update of Compilation of Air Pollutant Emission Factors supplements.
3. Periodic update of Emission Inventory Guide.
4. Annual publication of emissions, emission factors, and ambient concentrations of hazardous and non-criteria air pollutants.
5. Annual update of AQCR tabulation of data.
6. Annual publication of directory of monitoring sites. sions.
7. Annual publication of historical and projected emissions.
8. Terminal users manual (as developed by SDS) and data processing publications (as developed by DPS) when appropriate.
9. Annual publication of fuels usage data.
10. Annual publication of data quality information

OTHER FUNCTIONS

III. Development

1. Collects and updates data as required and performs analysis for data sensitivity, data confidence, confidentiality, history/projection of emissions, gridding/apportioning.
2. Provides lead support to RAPS project on emission inventory.
3. Develops engineering evaluation techniques for new edit and validation checks for AEROS data.
4. Defines methodologies for collection of new data not in AEROS and develops coding procedures and coding forms, subject to the approval of SDS.

IV. Maintenance

1. Answers non-routine and non-computerized requests, provides technical/engineering analysis as required.
2. Maintains liaison with OMSAPC and DOT regarding mobile source data bases and supplies necessary support to standards development as required.
3. Maintains liaison with RO, OFA, ESED, OEGC, etc. on engineering and technical matters.
4. Maintains reference files of emission factor and source test data.
5. Develops guidelines and instructions for use of NEDS, SAROAD, SOTDAT and HATREMS coding forms.

General Functions of Requests and Information Section include:

1. Obtain OMB (and other) required clearance for forms; maintain supplies of forms.
2. Develop EPA Orders and Regulations as necessary and coordinate Regulation and Order review.
3. Publish all technically complete documents, maintaining liaison with GPO on LINOTRON; maintain supplies of publications.
4. Receive and maintain records of requests; coordinate and provide to requestor; maintain library of sample computerized retrievals; Freedom of Information requests tracking.
5. Maintain and upgrade AEROS internal procedures documentation; coordinate with other sections on the manuals.
6. Maintain liaison with all users, supplying necessary documentation and setting up user community.

FUNCTIONS RELATED TO OUTPUT

I. Publishes technically complete reports
   1. Annual publication of air quality and emissions of criteria pollutants.
   2. Periodic update of Compilation of Air Pollutant Emission Factors supplements.
   3. periodic update of Emission Inventory Guide.
   4. Annual publication of emissions, emission factors, and ambient concentrations of hazardous and non-criteria air pollutants.

5. Annual update of AQCR tabulation of data.
6. Annual publication of directory of monitoring sites.
7. Annual publication of historical and projections of emissions.
8. Terminal users manual (as developed by SDS) and data processing publications (as developed by DPS) when appropriate.
9. Annual publication of fuels usage data.
10. Annual publication of data quality information.

II. Receives and maintains records of requests for AEROS data

1. Logs in requests from EPA users and transmits requests to DPS for processing; logs out requests upon completion.
2. Receives Freedom of Information requests, responds to requests indicating when and if information can be provided, determines user fees, if any, transmits requests to DPS or EFS for processing, transmits data to requestors, and maintains records to track all requests.

OTHER FUNCTIONS

III. Distribution of reports

1. Distributes four quarterly reports and one annual report of ambient concentrations of criteria pollutants.
2. Distributes one semiannual report of emissions of criteria pollutants.

3. Distributes periodic NEDS and SAROAD status reports.
4. Distributes AEROS documentation series (as OAQPS Guideline documents).
5. Maintains limited supplies of AEROS publications, coordinates with APTIC on wide-scale distribution.

IV. Coordinates documentation of AEROS activities
1. Coordinates with other sections on preparation of AEROS manual documentation.
2. Maintains and upgrades AEROS internal procedures documentation.

V. Provides user support services
1. Maintains supplies of AEROS coding forms (NEDS, SAROAD, SOTDAT, HATREMS).
2. Maintains library of sample computerized retrievals available.
3. Maintains liaison with all users, answers general requests, and promotes interaction within the user community.
4. Provides liaison with other EPA organizations (OEGC, ORD, RO, OFA, etc.). For receipt of data for updating of files, with assistance from EFS as required.
5. Maintains cognizance of activities involving use of AEROS compatible systems (EIS/P&R, AQDHS-II of CDHS) installed at state agencies, provides resources for system enhancements requested by users.
6. Distributes training materials regarding coding instructions, requirements, and available data retrievals.

7. Maintains liaison with users to determine additional requirements for use of AEROS data base.

VI. Other administrative activities

1. Obtains OMB (and other) required clearances for forms.
2. Develops EPA Orders and Regulations as necessary and coordinates Regulation and Order review related to AEROS.
3. Maintains liaison with AEROS contacts in Regional Offices.
4. Maintains current knowledge of status of CDS.
5. Access to and coordinates with GPA for use of electronic composing system (LINOTRON).

Basically AEROS is a reporting system which provides a mechanism to handle large amounts of data which are either purchased, obtained voluntarily, or are required to be submitted in accordance with Federal regulations. These data may be used for the following purposes:

1. Evaluation of plans and strategies to meet national ambient air quality standards (in support of Sections 107, 108, 109, and 110 of the Clean Air Act).
2. Evaluation of emissions and control equipment for the development of new source performance standards (in support of Section 111) and mobile source emissions standards setting (Sections 202 and 231).
3. Support of hazardous pollutants enforcement by EPA (Section 112), general enforcement actions by EPA (Section 113), and inspection/monitoring and other record-keeping (Section 114).
4. Determination of the status, projections, and trends of air pollution for reports and progress evaluation (Sections 304, 312, and 313).
5. Studies of fuels, their usage and availability (Sections 104, 211, 312, and 318).
6. Research on monitoring of sources and ambient air for modeling in programs such as Regional Air Pollution Study (Section 103).

The primary user of data, at this time, is OAQPS, and therefore the major emphasis for system development is support of OAQPS requirements. The amount of in-house and contractual emphasis each year is determined directly by the resources allocated to system development and maintenance, user assistance, request processing, etc. by OAQPS.

It has been recognized that intelligent management decisions cannot be made in a vacuum with no use of hard data. It is the intent of the data system managers in NADB to fill that void as expeditiously and as completely as possible, given the constraints of resources and agency operating policy. Therefore, the concept of data availability and its use has been foremost, keeping in mind the sources of data, quality control by those sources, and the requirements for data submittal. Some data are better than no data. Data of questionable value are better than no data. Although these two concepts can be disagreed with, it seems that a Federal agency with a highly visible technical program (air pollution) cannot base its decisions on anything but hard data. As the data are used and as the collectors of the data become more proficient, the data will be used with more confidence. The alternative of not using available data is simply not acceptable.

Section 313 of the Clean Air Amendments of 1970 specifies annual reporting to Congress of selected information. Certain items, especially (5), (6) and (9) are not possible without the use of air data systems. In addition, reporting under other sections such as (1), (3) and (8), is greatly assisted by the use of air data systems. To prepare the report under Section 312, extensive use of the air data system and especially the ability to estimate and forecast emissions, are essential.

Therefore, since monitoring is required in the State Implementation Plan (SIP) regulations for the purpose specified in the "intent to promulgate" publication preceding the regulations, a data handling capability was necessary, considering the large volume of information

anticipated. The reporting requirement is defined in §51.7 for both air quality and emissions data.

In addition, the OAQPS has internal data requirements necessary for the routine conduct of its specific mission. The data systems were developed to store the data coming in as required by reporting regulations and to retrieve the data as required by the headquarters of air programs. If others in EPA such as Regional Offices, ORD, or enforcement operations can make use of the data also, then a duplication of efforts can be avoided. EPA Order 7600.2 was developed for this specific purpose: the avoidance of duplication of effort in the collection of air pollution data. For the information of non-EPA readers, the EPA Order system is a basic means of policy implementation. EPA Order 7600.2 is reproduced on the following pages.

The objective of AEROS has been expanded somewhat as resources to develop a user community became available. Surveys of data users and potential users have identified desirable modifications to the system. However, it has been necessary to make conscious decisions to reject selected modifications because of complexity, cost, or simple mismatch with existing operations. In fact, certain potential users have been rejected because of the inability to even partially meet their defined needs. This has, under some circumstances, been unacceptable to users, but the resources to offset these problems have not been available.

The thrust of system development has been to provide a generalized system, weighing all suggested modifications to optimize the cost to

benefit ratio, keeping in mind the main objective of OAQPS requirements. In one instance, the Office of Enforcement decided in 1972 to develop the Compliance Data System, independently of AEROS, thereby indicating no further use of the air data systems.

The management philosophy then becomes one of attempting to provide a continuously increasing degree of generalized service to an increasing number of users. Little or no specialized or custom programming or development work is undertaken.

EPA Order 7600.2
March 25, 1974

POLICY, PROCEDURES, AND RESPONSIBILITIES FOR THE COLLECTION AND STORAGE OF AIR QUALITY AND SOURCE/EMISSIONS DATA

1. PURPOSE. This Order sets forth policy and procedures for the collection and storage of air quality and source/emissions data to ensure the validity of such data and prevent duplication of effort.

2. BACKGROUND. An increased national effort in collecting air quality and source/emissions data is leading to situations where EPA personnel incorrectly may collect or direct the collection of data on coding forms that have not been approved by the Office of Management and Budget (OMB) or by EPA. Further, such independent actions may result in new and valuable data outputs from such efforts being inadvertently excluded from the National Emissions Data System (NEDS) and Storage and Retrieval of Aerometric Data (SAROAD) data banks. Such actions may result in the following:

a. Unnecessary use of resources will occur when individual emitters or State and local agencies duplicate data submissions to multiple EPA offices.

b. Repetitive demands for identical data will result in a lack of cooperation between the States and EPA.

c. OMB policies will be violated when the private sector is repeatedly asked for the same data or if data are collected on unauthorized forms.

3. POLICY. The Environmental Protection Agency will collect air quality and emissions-related data in accordance with the following:

a. Official EPA- and OMB-approved forms for ambient air data collection (SAROAD Form: OMB Number 158-R0012) and source/emissions

data collection (NEDS Form: OMB Number 158-R0095 and Air Pollution Emission Report APER Form: OMB Number 158-R75) will be used by all EPA personnel involved in collecting, verifying, and updating such data.

b. Prior to initiation, all EPA projects, whether conducted in-house or by grant or contract, involving the collection of air quality or source/emissions data will be coordinated with the National Air Data Branch, Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711.

c. All ambient air data and source/emissions data collected by EPA personnel or their representatives will be submitted to the National Air Data Branch in the proper format and in a timely fashion according to a schedule agreed upon at the beginning of the project.

4. EXCLUDED PROGRAMS. This Order does not apply to data collection for the following systems or activities:

a. Compliance Data System (CDS).

b. Hazardous Air Pollutants Enforcement Management System (HAPEMS).

c. Research or experimental programs involving the collection of data which obviously is inconsistent or incompatible with the SAROAD/NEDS data banks.

d. Source/emissions data required to support enforcement actions.

e. Data collection programs involving ten sources or less.

f. Air quality data collection programs having a duration of less than ninety days.

5. SYSTEMS DESCRIPTIONS.

a. National Emissions Data System (NEDS). There are approximately 80 items of data stored on each point source, including the annual emission estimates which comprise the National Emissions Data Bank (NEDB). About the same number of items are maintained for each area source of emissions defined in NEDB as a county (or equivalent). There presently are about 75,000 point sources in the data bank and

about 3,300 area sources (county sources) in the 55 states and territories. NEDB is composed of two files (point and area) in which all data is integrated completely by source and by geographical area.

Data appearing on the NEDS coding forms include general source information, modeling parameters, emissions data, and compliance information.

b. Storage and Retrieval of Aerometric Data (SAROAD). SAROAD includes data resulting from measurements of six primary pollutants: suspended particulates, hydrocarbons, sulfur dioxide, nitrogen oxides, carbon monoxide, and oxidants. In addition, many trace elements and compounds have been included. Sufficient items to characterize the sampling site also are in the data bank. About 7,000 sites have been defined and have submitted data. In addition, "old" data collected by State, local, and Federal agencies have been incorporated into this data bank.

c. Data Flow and Information Access. The National Air Data Branch is the only group authorized to enter NEDS or SAROAD information into the data bank. This is to provide that quality assurance is applied uniformly to all data prior to entry. This standardization ensures that data on a nationwide basis are received in a common format and processed in a uniform manner. Although data flow is controlled centrally by the National Air Data Branch, access to the data is decentralized and available to many different users through terminals in Regional Offices, Washington, and Durham. The NEDS and SAROAD programs are on-line at the NERC, RTP, computer facility.

The incorporation of air quality data into SAROAD is cumulative, with data base refinements occurring with each measurement reported; whereas, submission of NEDS data revises the status of sources already in the data bank.

Two conditions are required for successful maintenance of the NEDS and SAROAD data bases.

(1) All air quality data must be recorded in SAROAD format and permanently incorporated in the data bank.

(2) All source and emission data must be recorded on NEDS coding forms and continuously added to the data bank.

The States are required to submit air quality data to the EPA Regional Offices in SAROAD format (quarterly) and their emissions data in the NEDS format (semiannually). There has been extensive coordination between NADB and the Regional Offices to define precisely the State, Region, and NADB data-handling procedures. Thus, it appears that the above conditions will be met for air quality and emissions data routinely submitted to EPA by the States.

6. RESPONSIBILITIES.

a. The Assistant Administrator for Air and Water Programs. The Monitoring and Data Analysis Division is responsible for the storage/retrieval, analysis, and publication of air quality data in the SAROAD system and source/emissions data in the NEDS system.

b. Assistant Administrators and Regional Administrators. Assistant Administrators and Regional Administrators are responsible for the collection and validation of air quality and source/emissions data and for the current submission of such validated data to the Monitoring and Data Analysis Division. Further, they should ensure that proposed data collection programs do not duplicate current or completed programs.

c. Assistant Administrator for Planning and Management. The Management Information and Data Systems Division is responsible for providing approval of the ADP technical content of the systems used to process air data; and for determining the need for and providing the necessary computing and telecommunications facilities for use by Program activities.

7. PROCEDURES. Prior to initiation of any air quality or source/emissions data collection program, a responsible program official will contact the National Air Data Branch, Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711 (FTS 919-688-8491).

Discussion between the NADB and the responsible program official will result in one of the following:

a. If the proposed project will acquire data which exists in NEDS or SAROAD, NADB will forward a computer printout of the required information.

b. If the proposed project duplicates part or all of an ongoing data acquisition effort, NADB will identify the duplicate program and recommend cancellation or refinement of the proposed project.

c. If the proposed project will acquire new data of value to NEDS or SAROAD, the NADB will request that EPA- or OMB-approved coding forms be used. In addition, NADB will furnish detailed instructions and procedures in the form of NEDS or SAROAD documentation. A data submission schedule will be mutually agreed upon by the responsible program official and the NADB. Officials in charge of the proposed project will be responsible for the subsequent correction and validation of the submitted data as needed.

d. If the proposed project entails the collection of air quality or source/emissions data beyond the level of complexity normally contained in the NEDS/SAROAD system, arrangements can be made with NADB for the computerized storage and retrieval of the additional data. In this manner, virtually all data collected during a project can be stored in one data bank and efficiently accessed by the project manager.

8. FORMS. Approved data collection forms and coding instructions for NEDS and SAROAD may be obtained from the National Air Data Branch, Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711 (FTS 919-688-8491).

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Acting Administrator

Unlike some other government data systems, there is no legislated report required from EPA on air pollution. However, the need for the ability to routinely report and to handle special requests was recognized. Therefore the air data systems have been developed to provide this generalized capability and to facilitate the publication of data for the broad range of users, both public and private.

The public requirement for data has gradually evolved, given the increased competence of the public awareness groups, the energy crisis, etc. Therefore there has been a continual effort to keep pace, in system capabilities, with the environmentally maturing public.

The EPA requirements, for the most part, have been generated internally within OAQPS. When a general agreement among Regional Offices could be obtained relative to their air data requirements, all possible effort has been made to satisfy the defined requirements. However, custom programming has not been generally possible; rather, the versatility and flexibility of the system have been enhanced.

Internally, to the data bank managers, the most important requirements of the system are the ability to routinely generate data publications and to process requests for data, making little or no attempt to analyze the data; the function of analysis and interpretation is better left to the user. However, the publications and requests are not specifically required by legislation.

Routinely the current users of the data and the system users are surveyed by questionnaires, RO visits and AEROS user meetings to ascertain desired modifications. However, in some instances it has not been possible to identify bonafide users, and this has complicated the planning process. Furthermore, it is absolutely necessary to evaluate the degree to which the system meets a user's needs and in most cases the user simply cannot accomplish this alone, since the flexibility and versatility of the system may sometimes be misunderstood.

In general, if anyone develops programs, tests and documents them to prespecified NADB standards, then they may become a part of the AEROS program library. All programs in the library are maintained by NADB and changes to the library may not be accomplished outside of NADB. This does not prevent users from developing their own programs for accessing AEROS files. However, NADB cannot be responsible for the impact upon user developed programs not maintained by NADB whenever changes are made to AEROS. These changes, usually precipitated by improvement and enhancement efforts associated with both the system and the facility may include such actions as file definition/nomenclature changes, etc.

The data quantity, quality and timeliness are the responsibilities of the Regional Offices, unless specific items of data are purchased (such as source test results, vehicle registration information, census data, etc.). The procedures for submittal of these data, as required by SIP Regulations §51.7 are defined in the AEROS manuals.

It is not the intention of AEROS management to provide the single air data base in EPA. Certain individuals may have specific requirements for storage and retrieval of data considered of little use to others. Therefore AEROS management may at certain times reject data or reject requests for system modifications to accommodate data of non-general use. Specific examples are RAPS data, CHESS/CHAMP and other research data, certain enforcement monitoring data, etc. which have not precipitated modification of the system. However, data from such efforts when reduced to an AEROS-compatible format, are solicited and incorporated.

NADB acts as the AEROS data base manager. No one else may actually enter data into the files, and no one else may change the definition of the files.

Anomalies or possible errors in the data bases should be identified to NADB. Investigations of these errors may result in the requirement of RO's to discuss the data with states and to submit delete or change actions.

Procedures for the flow of data are defined by NADB; however, it is not the responsibility of NADB to know why certain data have

or have not been submitted or why data may be late in arriving. This is a RO responsibility. It is possible for NADB to generate reports on the availability or quality of the data.

All users may directly access the AEROS data files via both batch and interactive terminals. All files are not accessible by both methods. All files (except for the AEROS interactive terminal system) have been defined and users may write their own access programs. Users may also use previously prepared and routinely circulated programs to provide standard data reports.

If none of the above methods are possible, there are also a few reporting programs which must be run from the computer facility by NADB. In these cases a request must be made of NADB, who will run the programs, check the results and forward the reports to the requestor.

Requestors without access to a terminal may also be serviced by NADB; however, major work performed by NADB to satisfy requests outside of NADB must be charged to the requestor's account. Funding to NADB is only sufficient to cover development costs, data base management, and requests processing internal to NADB. Other government agencies and their contractors are required to establish user accounts against which such work is charged. EPA contractors are required to make requests through their EPA project officer who must make arrangements for chargable accounts, etc.

The direct access of files by non-EPA users is not the responsibility of NADB, but rather that of the EPA computer facility operators in the National Computing Center. All requests for such capability should be addressed to MIDSD and the NCC. NADB has no opposition to such access; however, there is no intention at this time to financially support such access from the NADB budget. If non-EPA or non-government access is permitted at some time in the future, selective access must be arranged in order to protect the data specifically indicated as confidential.

There seem to be three levels of training required:

a. Generalized computer training,

b. UNIVAC training, and

c. AEROS training.

The first two levels must be accomplished before the third can be obtained from either the Civil Service Commission or in some instances from MIDSD/NCC. UNIVAC training can be obtained with the assistance of NCC from Sperry-UNIVAC.

AEROS training should be obtained using the Air Pollution Technical Institute courses already developed or in progress. Additional requirements should be defined to the Chief, APTI.

NADB plays an important role in assisting in the development of APTI courses on AEROS and in serving as guest lecturers. In some instances NADB gives assistance and custom training when specific problems with AEROS develop.